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(56) Documents cited  
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US 4477806 A US 4455588 A US 4425597 A

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(54) A vehicle door locking system

(57) A lockable door latch 1 has an exterior latch release means in the form of a door handle and a signal generator comprising a micro switch actuated by the door handle to generate a coded signal in the form of a number of groups of pulses and a control unit actuatable upon receipt of the coded signal to cause unlocking of the door latch 1. A vehicle interior light may flash after correct input of a pulse group. Central key operated locking may be provided with a second key operation setting an anti-theft alarm and deadlocking with deactivation of the control unit. The control may become inoperative after a pre-set consecutive number of incorrect inputs.

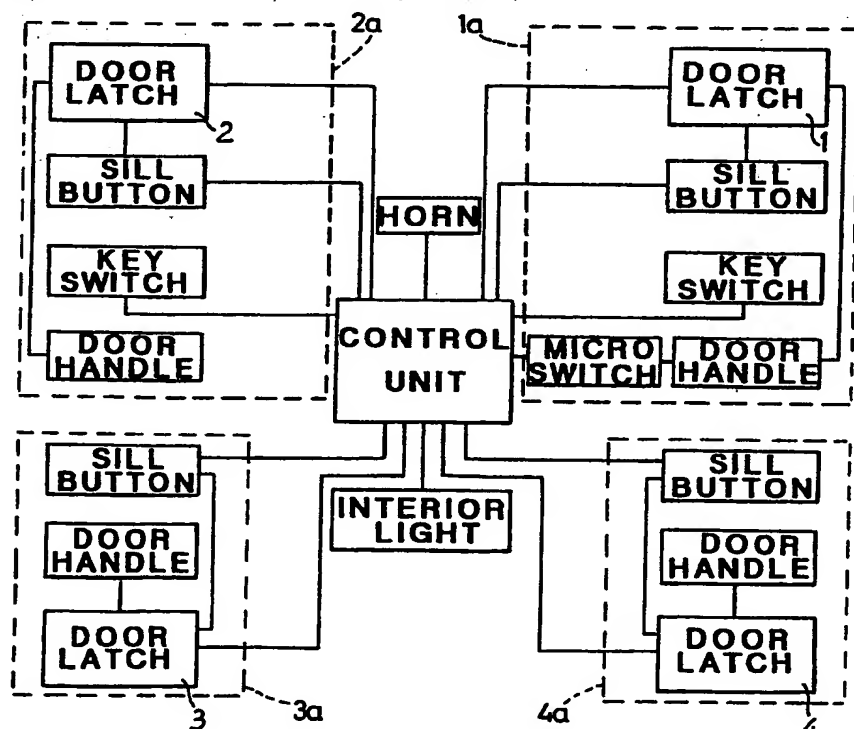


Fig. 1

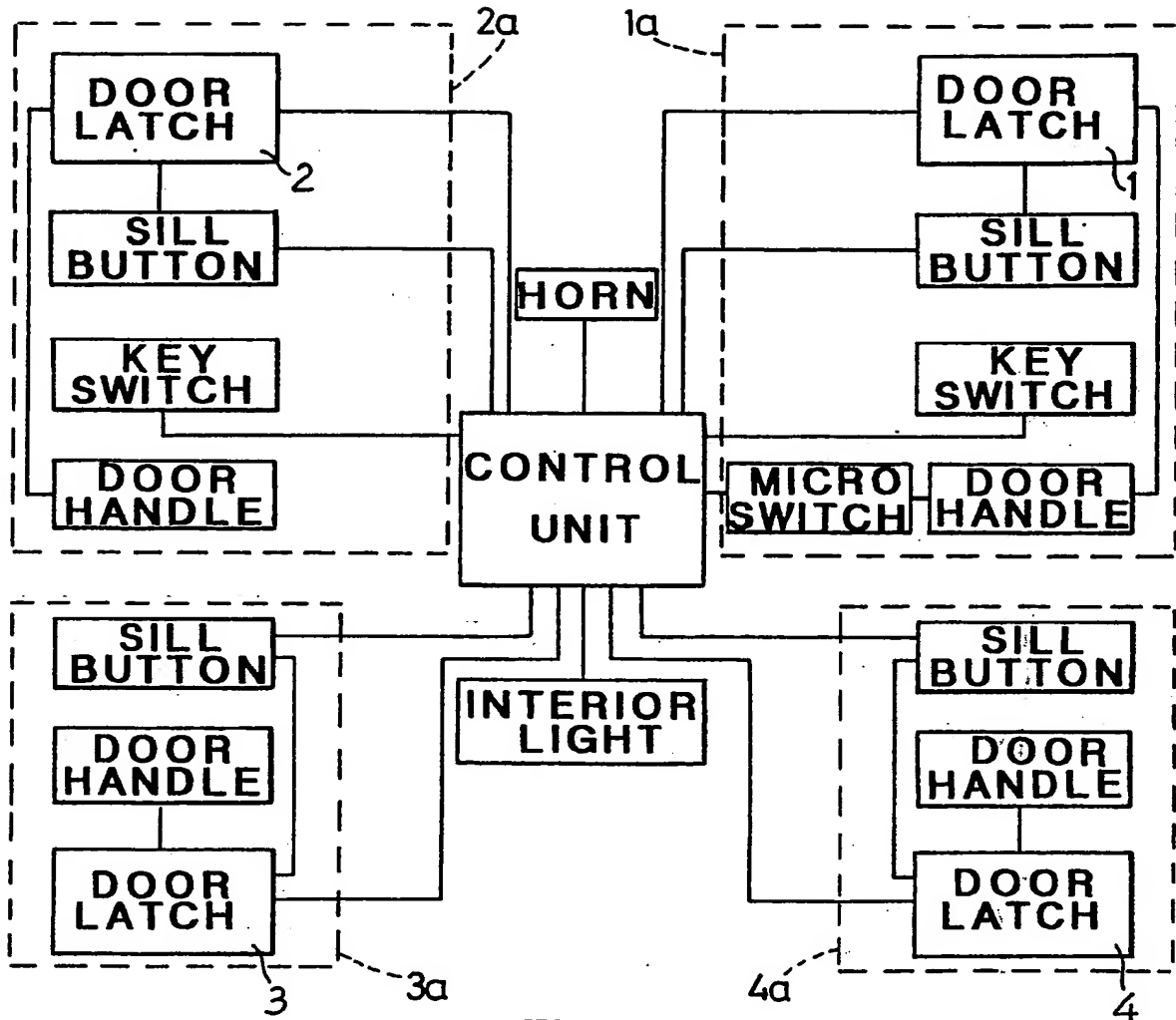


Fig. 1

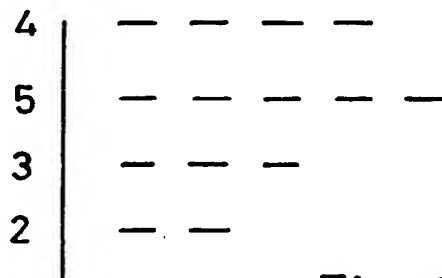


Fig. 2

-1-

A VEHICLE DOOR LOCKING SYSTEM

This invention relates to vehicle door locking systems.

It is known for vehicles to have keyless entry systems, both to offer the user the option of not having to use his key to gain entry and to enable entry to be gained in an emergency if the keys become locked inside after "slam locking".

It is known in particular to provide a keyless entry system for a vehicle wherein a numbered key pad is provided on the exterior of the driver's door for a user to select a numbered combination which sends a coded signal to a control unit which in turn unlocks the door latch.

It is a disadvantage of this sytem that such a key pad can be both expensive to install and unsightly.

It is an object of the invention to provide an improved keyless vehicle entry system.

According to the invention there is provided a vehicle door locking system including a lockable door latch, exterior latch release means therefor, a signal generator having a single control member operable from outside the vehicle to generate a coded signal and a control unit actuable upon receipt of the said coded signal to cause the latch to unlock.

A simplified and less expensive keyless entry system is thus provided.

The exterior latch release means, e.g. a door handle, may constitute the single control member, therefore providing a signal generator both very cheaply and without defacing the exterior of the vehicle.

The signal generator may include a microswitch responsive to operation of the single control member.

The said coded signal may comprise a pre-set number of groups of pulses, wherein each pulse may result from a single operation of the control member and each group may comprise a pre-set number of pulses.

For example the coded signal may be generated in four "digits", each digit corresponding to a number of individual actuations of the control member or "pulls" on the door handle.

As an alternative the coded signal may be generated by a series of relatively short and relatively long actuations of the control member.

The locking system may include indicator means responsive to a signal from the control unit and operable to indicate to the user receipt by the control unit of at least part of the coded signal, for example to indicate the receipt of each group of pulses.

In this way the system will tell the user when to commence sending the next group of pulses to the control unit.

The indicator means conveniently comprises at least one interior light of the vehicle, for example a light of a passenger compartment, or an ignition key light.

The control unit may comprise part of a central control unit for a central door locking system for the vehicle. Thus the only extra piece of "hardware" required to install the system may be, for example, a said microswitch

attached to the door handle. The requisite characteristics of the control unit could be accomplished merely by programming the central control unit appropriately.

The control unit may become unresponsive to the coded signal after receiving a pre-set consecutive number of incorrect coded signals from the signal generator. The control unit may be only restored to responsiveness by unlocking of the latch by an authorised instrument, for example a key or remote coded signal transmission unit.

In this way, anyone attempting to unlock the vehicle by trying a series of different coded signals, all incorrect, would be precluded from continuing after the pre-set consecutive number of attempts. The user, on returning to the vehicle on the other hand, would be able to unlock the latch using his key. The system may be arranged to signal to the user the unresponsiveness of the control unit, for example by operating the indicator means in a predetermined manner.

The locking system may include thief deterrent means in the form, for example, of an anti-theft alarm or means to deadlock the latch, wherein the control unit may be rendered unresponsive to the coded signal following

locking of the latch in conjunction with at least one of setting the alarm and deadlocking the latch. In this way vehicle security, as provided by an alarm or a deadlocking system, will not be compromised.

The present invention will now be described by way of example with reference to the accompanying drawings of which:-

Figure 1 is a schematic representation of a locking system, and

Figure 2 is a schematic representation of a coded signal used to actuate a control unit.

Referring to Figure 1, a control unit for a vehicle central door locking system is electrically connected to door latches 1, 2, 3, 4 for front and rear doors 1a, 2a, 3a, and 4a of the vehicle to lock, unlock and deadlock the latches on command. Key operated switches on driver's and front passenger's doors are operable in one mode to send locking and unlocking signals to the control unit and in a second mode to send an alarm-setting and deadlocking signal thereto.

The locking system according to the invention will be inoperable whenever the alarm and deadlocking have been set.

Front door sill buttons are actuatable to lock all door latches when depressed. In addition, each front door may be slam locked by first pulling the door handle whilst the door is open, depressing the sill button, releasing the handle and slamming the door.

A user-actuated signal generator comprises a single control member in the form of a driver's door handle and a micro switch connected thereto. In response to each operation of the door handle the microswitch sends a pulse to the control unit to which it is connected. A coded signal comprises a number of groups of pulses.

Feedback means in the form of an interior light for the vehicle is connected to the control unit to be lit upon command therefrom. The control unit is also connected to an alarm in the form of a horn to operate same on command.

Figure 2 shows four groups of pulses, each group corresponding to a digit according to the number of pulses in the group. Thus the coded signal shown would comprise the digits 4-5-3-2.

In use the door latches may be unlocked by using a key to unlock either key operated switch whether from the standard locked mode or whether from deadlock plus alarm mode. If the vehicle locking system has been slam locked



as described, or if the locking system has been put into the ordinary locked mode, without deadlocking and alarm, then the drivers door handle may be operated to generate the coded signal and unlock the driver's door latch. This is accomplished as follows. The user will have a coded signal memorised or written down in the form of a combination of digits. The coded signal here comprises four groups of pulses, each pulse being delivered by one movement of the door handle. The code, 5-4-3-2 is fed to the control unit by the user moving the door handle four times, waiting to see the interior light flash once, moving the door handle five times, waiting for the interior light again to flash once, moving the door handle three times, waiting for the interior light to flash once, and finally moving the door handle twice, whereupon the control unit will operate to unlock the driver's door latch 1.

If the wrong coded signal has been fed to the control unit by the user the interior light will be caused by the control unit to flash three times indicating that the user should start again. If three consecutive unsuccessful attempts at feeding the coded signal to the control unit are made, the control unit will become unresponsive to any

further signals from the door handle and the locking system may not be unlocked save with a key. Once the system has been unlocked with a key the control unit will once again be rendered responsive to signals from the door handle in the manner previously described.

It will be appreciated that variations in the locking system described may be employed without departing from the invention. For example, the locking system may be provided with a remote infra-red coded signal transmitter and receiver for locking and unlocking the door latches through the control unit.

CLAIMS

1. A vehicle door locking system including a lockable door latch, exterior latch release means therefor, a signal generator having a single control member operable from outside the vehicle to generate a coded signal and a control unit actuatable upon receipt of the said coded signal to cause the latch to unlock.
2. A vehicle door locking system as in claim 1 in which the exterior latch means constitutes the single control member.
3. A vehicle door locking system as in claim 1 or 2 in which the signal generator includes a microswitch responsive to operation of the single control member.
4. A vehicle door locking system as in claim 1, 2 or 3, wherein the said coded signal comprises a pre-set number of groups of pulses, each pulse resulting from a single operation of the control member, and each group comprising a pre-set number of pulses.
5. A vehicle door locking system as in any preceding claim, including indicator means responsive to a signal from the control unit and operable to indicate to the user receipt by the control unit of at least part of the coded signal.

6. A vehicle door locking system as in claim 5 when dependant on claim 4, wherein the indicator means is operable to indicate to the user receipt by the control unit of each group of pulses.
7. A vehicle door locking system as in claim 5 or 6, wherein the indicator means comprises at least one interior light of the vehicle.
8. A vehicle door locking system as in any preceding claim, wherein the control unit comprises part of a central control unit for a central door locking system for the vehicle.
9. A vehicle door locking system as in any preceding claim, wherein the control unit becomes unresponsive to the coded signal after receiving a pre-set consecutive number of incorrect coded signals from the signal generator.
10. A vehicle door locking system as in claim 9, wherein the control unit is only restored to responsiveness by unlocking of the latch by an authorised instrument.

11. A vehicle door locking system as in any preceding claim, including thief deterrent means wherein the control unit is rendered unresponsive to the coded signal following locking of the latch in conjunction with setting the thief deterrent means.
12. A vehicle door locking system as in claim 11, wherein the thief deterrent means comprises an anti-theft alarm.
13. A vehicle door locking system as in claim 11 or 12, wherein the thief deterrent means comprises means to deadlock the latch.
14. A vehicle door locking system substantially as herein described with reference to the accompanying drawings.

**Patents Act 1977****Examiner's report to the Comptroller under  
Section 17 (The Search Report)****-12-**

Application number

9102563.5

**Relevant Technical fields**

(i) UK Cl (Edition K ) E2A

(ii) Int Cl (Edition 5 ) E05B 47/, 49/

**Search Examiner**

R J Dennis

**Databases (see over)**

(i) UK Patent Office

(ii)

**Date of Search**

25 March 1991

Documents considered relevant following a search in respect of claims

1 to 14

Category (see over)	Identity of document and relevant passages		Relevant to claim(s)
Y	EP-A1-0139059	(Carter.....)	8 to 10
X	EP-A2-0078962	(Gemini.....)	1 at least
X	US-4778206	(Fuji.....)	1 to 4
Y	US-4477806	(Nissan.....)	9
X	US-4455588	(Nissan.....)	1 to 4

SF2(p)

Category	Identity of document and relevant passages	Relevant to claim(s)

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